Plan of Work and Budget

2017

17 February 2017

CGIAR is a global partnership that unites organizations engaged in research for a food-secure future. The CGIAR Research Program on Livestock provides research-based solutions to help smallholder farmers, pastoralists and agro-pastoralists transition to sustainable, resilient livelihoods and to productive enterprises that will help feed future generations. It aims to increase the productivity of livestock agri-food systems in sustainable ways, making meat, milk and eggs more available and affordable across the developing world. The Program brings together five core partners: the International Livestock Research Institute (ILRI) with a mandate on livestock; the International Center for Tropical Agriculture (CIAT), which works on forages; the International Center for Research in the Dry Areas (ICARDA), which works on small ruminants and dryland systems; the Swedish University of Agricultural Sciences (SLU) with expertise particularly in animal health and genetics and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) which connects research into development and innovation and scaling processes.

The Program thanks all donors and organizations who globally supported its work through their contributions to the [**CGIAR system**](http://www.cgiar.org/about-us/our-funders/)

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**CRP Annual Plan of Work and Budget (POWB) for 2017**

Name of the CRP: **LIVESTOCK**  Name of the Lead Center: **ILRI**

List of participating Centers and other key partners (including logos):

Implementing partners:

* CIAT
* ICARDA
* Swedish University of Agricultural Sciences (SLU)
* Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Collaborating partners:

* IWMI
* ICRAF
* Wageningen University Research

**Logos**



**A.** **CRP LEVEL**

**A1. Delivery**

**A1.1** **Adjustments/ changes to** **your Theories of Change**

Our CRP Theory of Change remains as described in the Livestock CRP proposal. The System Council decision to not approve W1/2 funding for two flagships (FP) and reduce funding for management by 35% affects the timing of certain activities in the short term, and if it emerges that funding restrictions are longer term, the Theory of Change will be adjusted. The two FPs without W1/2 funding each have a substantial body of bilateral-funded activities that ensure continued momentum of the FP research agenda. The partners are contributing their own resources to ensure continued management of the two FPs so that both existing bilateral-funded activities and new ones under development contribute as effectively as possible to achieve the CRP’s targeted outcomes. Withdrawal of W1/2 funding for the two FPs and CRP management delays significantly key cross-cutting efforts that deliver critical enabling factors for change, including gender, youth, foresight and targeting research and, very importantly, integration of CRP research at country level.

**A1.2** **Highlight expected Outcomes and Outputs**

Three of the CRP FPs focus primarily on generating technologies and promoting their uptake to increase productivity of livestock raised in smallholder or extensive systems. Key outcomes and outputs regarding the main drivers of livestock productivity include the creation of new capacity and platforms that enable application of new genomics approaches for breeding improvement under the recently established Centre for Tropical Livestock Genetics and Health by the Roslin Institute, Scotland’s Rural College and ILRI, with a gene-editing facility at ILRI Nairobi. New research is being initiated on poultry genetics, with gendered baseline information on poultry systems to be generated in selected countries and the first CGIAR poultry research facility established. Production and release of a vaccine for *peste des petits ruminants* (PPR) will be assistedin Mali and Botswana in partnership with pharmaceutical companies and proof of concept achieved for next steps in vaccine development for five livestock diseases. A framework and tools will be developed to assess priorities for new research on herd health management in smallholder livestock systems. Key next steps for two major forage breeding lines will be completed, and Urochola hybrid lines will be scaled through private sector partners to at least 100,000 ha in 15 countries.

The new FP on Livestock and the Environment significantly expands the work initiated under the Livestock and Fish CRP. The first assessment of greenhouse gas (GHG) emissions done jointly with CCAFS will be completed in three common livestock production systems in three countries of Africa and South East Asia, addressing an imbalance in evidence informing climate change policies affecting livestock. Similarly, a strategic analysis of animal source food supply and demand to 2030 and 2050 and implications for food security will be produced jointly with PIM.

**A.1.3** **Use of different** **Funding Sources**

The CRP relies on restricted funding for a portfolio of W3 and bilateral projects accounts that are well aligned to the overall CRP and specific FP research agendas, but can make only a limited contribution to the specific outcomes defined in the CRP proposal. W1/2 is therefore applied to priority research activities that specifically target the outcomes we are seeking to achieve and add value to the more restricted W3/bilateral projects. For FP1 this funding is leveraging bilateral funding to establish proof-of-concept that indigenous poultry genetics can contribute to breeds better adapted and more productive in developing country contexts. FP2 is using W1/2 to initiate new research assessing livestock health priorities and opportunities to improve management of herd health in the CRP target countries, and to leverage bilateral funding for a key step in developing an improved vaccine for East Coast fever. For FP4, W1/2 funding will produce an innovative framework that can evaluate the environmental impacts of productivity enhancing livestock technologies and other relevant evidence, and support policy engagement in the target countries.

CRP management and governance accounts for 11% of the W1/2 funding. An additional 18% of the W1/2 funding is dedicated to a Strategic Investment Fund that is funding ‘capital’ investments in cross-cutting research serving the overall CRP agenda, such as gender mainstreaming, priority impact studies to inform future CRP investment, and the roll out the CRP M&E system, as well as exploring new areas of research.

**A1.4** **Planned Revisions to your Program of Work**

The only significant revisions to the program of work relate to the postponed activities under FP3 and FP5 that were to be funded from W1/2. As the result, progress in establishing the impact pathway for integrating the CRP research results into transformative interventions in priority countries will be very limited.

**Table 1: CRP planned budget by flagship for 2017**

|  |  |  |  |
| --- | --- | --- | --- |
| **Flagship Name** | **Planned Budget 2017 (USD)** | | |
| **W1/W2** | **W3/bilateral** | **Total** |
| FP1 Livestock Genetics | 3,749,402 | 8,030,625 | 11,780,027 |
| FP2 Livestock Health | 3,937,392 | 4,659,886 | 8,597,278 |
| FP3 Feeds & Forages | 0 | 2,947,320 | 2,947,320 |
| FP4 Livestock & the Environment | 2,225,805 | 6,178,150 | 8,403,955 |
| FP5 Livestock Livelihoods & Agri-Food Systems | 0 | 12,958,553 | 12,958,553 |
| CRP Management & Support Cost | 1,569,117 | 0 | 1,569,117 |
| Strategic Investment Fund | 2,533,000 | 0 | 2,533,000 |
| **Total** | **14,014,716** | **34,774,534** | **48,789,250** |

**A2. Collaboration and Integration**

**A2.1 Contribution to and from Platforms**

FP3 will continue to work with the Genebank platform through the Use Module by integrating data and tools across the programs and supporting the identification and promotion of subsets from the forage and food-feed crop collections for livestock feed applications. The forage collections will also act as the major source of diverse germplasm for joint evaluation and breeding activities. Similarly both FP1 and FP3 are monitoring the opportunities for collaboration with the Excellence in Breeding platform as its agenda is developed. There is joint interest in extending the current platform focus on crop breeding to include animal breeding.

Joint definition with the Big Data platform of priority needs and opportunities for collaboration will continue. The CRP will coordinate with the Organise Module of the platform in facilitating compliance with the Open Data policy through CRP investment to improve access to CRP-related data. Under the Inspire module, the CRP is prioritising initiatives for cross-CRP challenge grants for (i) linking genomic and phenomic data related to livestock and fish, forages and feed crops, and (ii) integrating livestock systems data into CGIAR foresight efforts.

The CRP’s gender team will seek opportunities to participate actively in the Gender platform for capacity building, networking and development of cross-CRP gender collaboration, though these may be limited due to the W1/2 restriction for FP5.

**A2.2 Cross-CRP interactions**

FP4 is providing the livestock perspective and CCAFS the larger framework for a first assessment of GHG emissions from selected livestock production systems in Kenya, Tanzania and Vietnam. The results will be used to establish regional baselines for assessing the long term impact of sector development on mitigation of GHG emissions, and will be an important joint milestone in creating an evidence base to support decision makers in promoting appropriate environmental management options (Outcome 4.3). FP 4 is also working with CCAFS to use their climate change scenarios to ascertain impacts for livestock productivity and targeting of key interventions, which will help convince livestock development investments to take into account environmental issues (Outcome 4.4).

FP5 will collaborate with A4NH with respect to aflatoxins in milk in Kenya within a major bilateral project, building on the A4NH assessment in East Africa. Three bilateral projects looking at livestock mediated pathways towards improved nutrition in Kenya and Tanzania will be applying A4NH expertise and tools.

The CRP is a shareholder with several other CRPs in an effort led by CIAT to develop a shared M&E planning and reporting tool, MARLO, to be rolled out in early 2017. The CRP continues collaboration with PIM to strengthen the livestock component in the IMPACT activity.

**A2.3 Expected Efforts on Country Coordination**

The CRP will begin implementing its support to the CGIAR country collaboration (CCC) initiative as described in the proposal. During 2017, Livestock CRP country teams in seven CRP target countries (Ethiopia, Tanzania, Uganda, Kenya, Nicaragua, Vietnam, Tunisia) will be mobilized to participate pro-actively with their CCC group and align with the forthcoming SMB recommendations. To deliver the new CRP agenda, a concerted effort will facilitate development of country strategies, strengthen country team leadership and partnership skills, and roll out the CRP M&E system, with particular attention to how these contribute to CCC. In addition, the CRP is contributing $5000 in each target country for collective CCC activities.

**A3. Management, Governance and Monitoring, Evaluation, Learning**

**A3.1 Relevant Changes in Management and Governance**

The CRP is implementing the management and governance structure as described in the proposal, but with adjustments to reflect the 35% budget reduction to Management & Support Costs and two flagships unfunded as decided by the SC. The Independent Steering Committee will have five instead of six independent members for 2017, with one of its two meetings converted from face-to-face to virtual. A CRP Program meeting for all CRP staff is postponed until 2018.

**A3.2 Monitoring, Evaluation, Impact Assessment and Learning Plans**

To accommodate the 35% budget reduction to Management, the first CRP-commissioned eternal evaluation will be postponed to 2018.

Priority is being given to rolling out the CRP M&E system within both the flagship and country teams. At flagship level, the system includes establishing the online planning and reporting system MARLO and an annual learning process to review the evidence base underpinning the Theory of Change. Within the CRP target countries, a Change Monitoring framework will be initiated. Since M&E relies on W1/2 funding, some components of the M&E system to be managed at FP level will be postponed for FP3 and FP5, which will rely on what can be generated within their bilateral projects.

The CRP has prioritized a multiple level impact assessment of forage research to complement a study being undertaken by SPIA. This work is considered critical to CRP management to ensure its funding decisions take into account feedback from the ISPC on the lack of such evidence. As noted in the CRP proposal, this work is funded from the CRP’s Strategic Investment Fund rather than FP3, and so does not contradict the SC W1/2 funding decision.

**B. FLAGSHIP LEVEL**

**FP1: Livestock Genetics**

**B.1 Delivery**

**B.1.1 Expected Annual Milestones towards Outcomes 2022**

Four milestones in 2017 will demonstrate progress towards supporting development and expansion of breeding programs and/or conservation strategies by policymakers, national research and development partners, and the private sector (Outcome 1.1) so that improved genetics can be delivered and taken up to improve livestock productivity (sub-IDOs 1.3.2, 1.4.3, 1.4.4). To enable local and national partners to prepare scaling up community-based breeding models in Ethiopia, a targeting decision tool mapping environmental suitability for sheep and goat populations will be provided. As a first step to designing country-specific conservation and breeding strategies, baseline characterization information of existing livestock (small ruminant, cattle, chicken) populations, including genome sequencing, will be available for Ethiopia, Tanzania and Nigeria. Characterization baselines of livestock systems for small ruminants, cattle and chickens, in collaboration with national research programs, will be established for Kenya, Senegal, Ethiopia and Sudan. Finally, an updated understanding of the roles of women and men in household livestock activities will be generated through a set of baseline gender studies, so that differential challenges created by breeding interventions can be anticipated.

To develop appropriate genetics that will improve productivity and profitability of livestock raised in the contexts targeted by the CRP (sub-IDOs 1.3.2, 1.4.3, 1.4.4), additional capacity must be established (Outcome 1.2). FP1 will provide a set of additional tools to facilitate the up-scaling of breeding interventions in 2017, and two more milestones by establishing platforms in support of the application of new genomics approaches for breeding improvement. These platforms will support the development and fine-tuning of ICT tools for field recording of productivity (proof of concept phase) in chicken and cattle, the establishment a poultry breeding facility at ILRI Addis and the establishment of a gene-editing facility at ILRI Nairobi. The last two are being developed in partnership with the Centre for Tropical Livestock Genetics and Health recently established by the Roslin Institute, Scotland's Rural College and ILRI.

Stronger and resilient research and delivery systems (Outcome 1.3) are needed to ensure genetic improvements and their delivery to livestock keepers are sustained and make an impact on yield gaps (sub-IDO 1.4.2, 1.4.3). To this end, a knowledge base that is documented and supports development of business plans for long-term genetic gains strategies in chicken, small ruminants and dairy cows, will be a key milestone. It will include technical reports on breeding management models and protocols for institutional arrangements.

In developing guidance for a range of stakeholder to conserve and manage animal genetic resources (Outcome 1.5; sub-IDO 1.4.4), FP1 will achieve two initial milestones: the preparation and publication in close collaboration with the African Union-InterAfrican Bureau for Animal Resources (AU-IBAR), of a set of policy briefs and guidelines on access and benefit sharing of animal genetic resources, and a series of review publications on institutional and policy challenges related to cattle crossbreeding programs.

**B.1.2 Output towards Outcomes 2022**

Six key outputs will be delivered in 2017. The first will make available new datasets and knowledge on phenotypes, genotypes and agro-systems characteristics (chicken, small ruminants, cattle), including steps to integrate this information in a single database (DAGRIS) that relevant stakeholders can access to develop or refine genetic improvement and conservation strategies (Outcomes 1.1, 1.5). Second, improved breeding schemes will be defined for community-based breeding programs and for chickens (Outcome 1.2). The adaptive signature of selection at genome level to environmental challenges (e.g. climate (heat) and infectious diseases selection pressures for cattle) will be reported as a third output to inform genetic improvement strategies (Outcome 1.2), as well as new technologies (phenotypic platform, optimised open-data kit (ODK) systems, genome editing protocols) developed. The fifth output will be the assessment of institutional arrangements for delivery of improved genetics and guidelines on delivery options for dairy cattle. These will be integrated into business models for the multiplication and delivery of improved livestock genetics (Outcome 1.3). Finally, a review on published baseline information on best practices and lessons on improvement of animal genetic resources in Africa will contribute to guidelines for improving and conserving animal genetic resources targeting the CRP priority countries (Outcome 1.5). The third and fourth outputs have capacity development activities embedded in them. The second and last outputs have strong gender and youth dimensions built into them.

**B.1.3 Contribution of W1-2 Funds**

The first two Clusters of Activities have the largest number of activities in 2017 and are also allocated the great proportion of W1-2 funds (CoA 1 45%, CoA CoA 2 48%). In these CoA, W1/2 will mainly support the implementation of priority activities not supported by W3-bilateral including the recruitment of new expertise (bioinformatician, visualization specialist) to integrate phenotype, genotype and agro-system characteristics into a single database. W1/2 will also allow FP1 to undertake gender studies unfunded in W3-bilateral projects, as well as support the implementation of pilot studies to collect baseline data for other subsequent funding opportunities (e.g. microbiome analysis). Finally, W1/2 will support specific research platforms including a biorepository and the Kapiti breeding station for cattle and small ruminants, and it will provide seed support to new initiatives (e.g. developing a phenotypic platform).

**FP2: Livestock Health**

**B.2 Delivery**

**B.2.1 Expected Annual Milestones towards Outcomes 2022**

A critical first step to improve capacity to assess animal health priorities (Outcome 2.1) is to establish a working framework and suite of tools for testing and validation and to inform other work in the FP. This milestone will be achieved in 2017 in cooperation with regional organisations like AU-IBAR, and nationally with NARS and extension services in the priority CPP countries. To start the process of formulating herd health management packages, with particular attention to antimicrobial resistance (AMR) (Outcomes 2.2, 2.3), a framework and criteria for evaluating such packages and baseline AMR-related information will be completed this year in consultation with national animal health services, extension services and farmers. We are interacting closely with CRP A4NH in the overlap areas of zoonoses and AMR. These are all critical first steps to better information and practices for reducing livestock disease and their associated losses and public health hazards (sub-IDOs 1.4.2, 2.2.1, 2.3.2).

The advanced biotechnological work in the flagship is directed towards use of novel diagnostics assays and vaccines for important livestock diseases (Outcome 2.4). By the end of 2017, two milestones will be achieved; first, production and release of a vaccine for *peste des petits ruminants* (PPR)in partnership with biotech/pharmaceutical companies and second, proof of concepts achieved in vaccine development for five livestock diseases, and development of novel diagnostic methods for two diseases. This latter advanced biotech development work is performed in close cooperation with several academic institutions in different regions of the world. The milestones represent progress towards technologies that can reduce livestock losses and close yield gaps (sub-IDOs 1.4.2, 2.3.2)

Working toward improvement of access to animal health services and products (Outcome 2.5), the preparatory and necessary assessment of current delivery system of services and products in the CRP priority countries is a critical milestone to be delivered in 2017. This will inform the direction for the program’s future research. Another, even more applied one, is the completion of testing of two previously developed livestock health services and products, which will be performed together with extension service and animal health service partners in the field. These again target reducing livestock losses and closing yield gaps (sub-IDO 1.4.2, 2.3.2)

Notably, all milestones with the exception of the biotech work have a strong gender component to monitor differential impacts on women (sub-IDO CC2.2).

**B.2.2 Output towards Outcomes 2022**

There are four key outputs 2017. The first is a set of gender-sensitive assessment tools for identifying site-specific disease priorities and a modelling framework for quantifying disease impact together with risk maps, focusing initially on East Coast fever (ECF), African swine fever (ASF) and PPR. These tools and modelling frameworks are the first and logical preconditions towards the assessment of the significance of animal diseases and provision of disease risk maps to guide and prioritize our work in the CRP priority countries

The second is a baseline assessment of key herd health issues in priority CRP countries and a framework for identifying appropriate herd health package components, including protocols for determining availability and knowledge-attitude-practices of antimicrobial and antiparasitic use for two CRP priority countries. These are the starting points and prerequisites for successful work towards the adoption of context specific herd health packages by farmers and extension and animal health personnel and towards changed practices in the use of antimicrobials and antiparasitics among farmers, respectively.

Third is a set of next steps in disease control technologies for specific diseases. A new lateral-flow diagnostic for contagious bovine pleuro-pneumonia (CBPP) will be completed and feasibility assessment for small ruminant mycoplasma diagnostics finalized. Proof-of-concept data will be generated for vaccines against ECF, CBPP, contagious caprine pleuro-pneumonia (CCPP) and ASF. Also critical data on production and assessment of PPR vaccine will be achieved.

The last comprises assessment of the current status of gendered animal health service and product delivery in CRP priority countries as a key input to identifying the most relevant delivery models to be tested. This output also includes testing of delivery and scaling up of existing technologies, including PPR vaccine testing in Mali and Botswana, ECF Infection and Treatment Method delivery in Tanzania and Kenya and validation of CBPP and CCPP ELISA diagnostics.

The first, second and fourth outputs have a very strong gender profile and the first two also have clear youth dimensions built in. All four outputs integrate significant capacity development.

**B.2.3 Contribution of W1-2 Funds**

W1-2 funds will be used to secure long-term research from detrimental fluctuations in bilateral funding, to support new research areas that will attract bilateral funding and to fund research areas critical for FP2 or the CRP as a whole but where it is judged difficult to raise bilateral funding. The initiation of research on herd health management and AMR is therefore getting a significant share of the W1-2 funding. In 2017 it will be used for developing tools and protocols needed to prepare field research. These tools and protocols are crucial for FP2, but difficult to cover from bilateral funding at this early stage; establishing the protocols will enhance our ability to attract substantial bilateral funding. The work on diagnostics and vaccines is given the largest share in the FP2 budget in order to ensure sufficient critical mass is achieved for this long-term biotech research. In 2017, significant W1/2 funding is allocated to ECF vaccine development and is leveraging considerable external funding. The new effort to address delivery of livestock healthcare products and services is assigned a relatively small share of the overall FP budget as it is judged able to attract bilateral funding from donors at the research-development interface. In 2017, the funding will be used for review of models for animal service delivery and optimize gender sensitive ECF Infection and Treatment Method delivery as starting points.

**FP3: Livestock Feeds and Forages**

**B.3 Delivery**

**B.3.1 Expected Annual Milestones towards Outcomes 2022**

FP3 is not approved for W1/2 funding in 2017. FP3 will therefore rely on bilateral funded activities which has required adjustments both thematically and in terms of geographical focus.

In working to enable R&D partners to diagnose feed problems and prioritize solutions (Outcome 3.1), FP3 will achieve a first milestone of ensuring access to a set of feed supply and analysis tools and scientific forage knowledge that help to align research priorities and to facilitate decision making processes. A second milestone strengthens capacity for feed research (Outcome 3.2) by providing new equations for stationary and mobile Near Infrared Spectroscopy (NIRS) that will increase efficiency in FP3 breeding activities and research globally. These enhanced capacities will accelerate delivery of technologies that promote more efficient use of feed resources (sub-IDO 1.3.4).

Three milestones are planned for developing improved forage and crop cultivars to maintain genetic gain in priority contexts (Outcomes 3.3, 3.4; sub-IDO 1.4.3). These relate to advancing Urochloa materials to next steps in the breeding pipeline including significant uptake in 15 countries, genotyping a collection of Pennisetum for further selection, and identifying potential cultivars of maize, rice, wheat, sorghum, millets, cowpea and barley to initiate breeding activities.

To make progress towards better use of feed resources (Outcome 3.5) a prototype tool for estimating productivity gains and cost trade-offs will be made available to allow pilot-testing with development partners in 2018. Second, baseline information on silage practices will be established to prepare on-farm pilot-testing of feed preservation approaches in 2018. The prototype tool will enable research and development partners to assess whether proposed interventions such as feed preservation effectively contribute to closing yield gaps (sub-IDO 1.4.2).

For livestock keepers to use feed resources more efficiently (sub-IDO 1.3.4), they need access to better products and services. An approach for designing novel business models for feed-related services (Outcomes 3.6, 3.7) will be made available, ready for pilot testing by partners in 2018. A second milestone will be significant, active exchange established with Innovation Platforms, Roundtables and private sector as a first step to facilitate uptake of FP3 outputs by value chain actors, and influence policy making (Outcome 3.8).

**B.3.2 Output towards Outcomes 2022**

To support partners to diagnose feed constraints and target interventions, feed demand scenarios will be developed for Vietnam and Ethiopia, and scientific articles published about forage resources at the global scale (Outcome 3.1). Local use of NIRS will be validated and documented in Ethiopia and Colombia to establish critical capacity for the CRP agenda (Outcome 3.2).

Development of improved forages (Outcome 3.3) will include next steps in breeding pipeline for Urochloa (Colombia), Megathyrsus maximus (Colombia), Pennisetum purpureum (Ethiopia) and Cactae (Tunisia). For Urochloa, defining new cohorts will focus on stress tolerance and Biological Nitrification Inhibition (BNI) capability. We will also work on the identification of potential cultivars of maize, rice, wheat, cowpea and barley for further breeding activities as full-purpose crops (Outcome 3.4).

To enable better utilization of feed resources (Outcome 3.5), an interactive tool will be developed based on feed demand-supply scenarios that will offer decision making features such as estimating impact of changed in feed resources (quantity and quality) and livestock genetics (for example local vs improved). The tool, though generic, will first be tested in Ethiopia with the Ethiopian Transformation Agency using local feed and livestock data. Another prototype tool will be developed for estimating increased productivity and reduced feed and labor costs as well as on commercial and on-farm silage production alternatives for feed conservation (India).

To stimulate feed-related SMSE development (Outcome 3.6), the basic inputs necessary for defining new business models around feed processing, forage marketing or seed multiplication will be consolidated. This contains business plans (Tunisia), cost-benefit analyses of improved forages, livestock systems and feed processing technologies (Kenya, Colombia), the development and distribution of technical fact sheets (Tunisia), and gender sensitive analysis of adoption factors (Colombia). Identifying effective extension approaches (Outcome 3.7) will begin through baseline surveys and expert consultation to describe the existing gaps for dissemination of promising feed, forage and processing technologies in Tunisia and Colombia. To increase delivery and use of improved feed and forages resources (Outcome 3.8), two regional innovation platforms will be established in Tunisia with a gender focus included, the private forage seed sector in Kenya will be engaged, and FP3 scientific findings and concepts will target the Colombian Roundtable for Sustainable Beef. The development of business plans, cost-benefit analyses and technical fact sheets as well as the transfer and exchange of knowledge through Innovation Platforms include a Capacity Development component.

**B.3.3 Contribution of W1-2 Funds**

No W1-2 funds have been allocated to FP3 for 2017. Management of FP3 will be supported in the interim by CIAT.

**FP4: Livestock and Environment**

**B.4 Delivery**

**B.4.1 Expected Annual Milestones towards Outcomes 2022**

An important first step to having environmental concerns considered in decision making in CRP priority countries (Outcome 4.1) will be achieved in 2017 by establishing a framework for assessing environmental footprints of technologies and interventions. The framework will be thoroughly tested in at least two countries, and both results and associated assessment tools will then be disseminated to a wide variety of analysts, development actors and policy makers through innovative training modules and communication products. This serves to begin establishing national capacity for formulating better and more equitable policies for natural resource management (sub-IDO 3.2.1).

The second 2017 milestone will be a first assessment of GHG emissions from three common livestock production systems using standard production techniques in Kenya, Tanzania and Vietnam. This will generate a novel body of evidence that will help convince government agencies and development partners to promote environmental management options (outcome 4.3). This assessment is an important step to develop a regional baseline for the sector, and is a joint milestone with CCAFS. A regional baseline is needed for assessing the long term impact of sector development on a key environmental service, mitigation of GHG emissions.

A third milestone will be to make available a synthesis of policy issues on reducing GHG emissions from livestock. This will serve national government agencies in designing and implementing key policies to improve the environmental management of livestock systems (outcome 4.4). These types of policies support increasing resilience of agroecosystems and communities (sub-IDO 3.3.1).

**B.4.2 Output towards Outcomes 2022**

In addition to the milestone above, one other output in 2017 will serve to sensitize decision-making about environmental concerns (Outcome 4.1), namely a research paper on the gendered and other social differences in livestock management and sensitivities to environmental change. These analyses will guide decision makers on the equity implications of promoting different packages of technologies, and likely differences in uptake and adoption by gender, income, and household size.

Several assessments of the environmental impacts of packages of technology interventions, including forages and breeding, are 2017 outputs that contribute to uptake of targeted solutions to increase livestock productivity in the face of ongoing environmental change (Outcome 4.2). These assessments apply the framework delivered as a 2017 milestone. They will include environmental impacts beyond GHG emissions, specifically water use, nutrient mining and biodiversity loss, providing evidence to effectively target solutions.

Progress towards enabling stakeholders at local and national levels to promote environmental management options (Outcome 4.3) will be made through three outputs. First, research reports on rangeland restoration in three countries and one publication will be produced. Second, reports on GHG emissions from feeding cattle local diets, manure management, and biodigesters will be made available. These also contribute to the 2017 milestone. Third is a report evaluating the roles of women and youth in the environmental management (and impact) of livestock production.

To develop capacity of national government agencies to design and implement key policies to improve the environmental management of livestock systems (Outcome 4.4), 2017 outputs include an assessment of current initiatives to improve land and resource tenure arrangements and initial collaboration with government partners on key policy mechanisms. Third is national policy advice on GHG mitigation and building resilience to drought.

Regarding payments for ecosystem services (Outcome 4.5), an evaluation of current opportunities and constraints including policy and institutional issues will be completed.

Finally, issue papers on GHG mitigation and drought resilience will be produced as evidence to influence key global livestock agendas (Outcome 4.7).

**B.4.3 Contribution of W1-2 Funds**

Window 1/2 funds contribute to all outcomes. Developing the innovative framework to evaluate the environmental impacts of productivity enhancing technologies is primarily financed by W1/2 (Outcome 4.1). The research will also clarify how gender and youth and well as other social/ economic differences interact with implementation of solutions and their environmental footprint. The work to enable local and national promotion of environmental management options relies on both W1/2 and bilateral sources, with the W1/2 supporting evaluation of the environmental costs and benefits as well as specific attention to gender and youth, including the development of tools for gender and youth empowerment (Outcome 4.3). Policy engagement (Outcomes 4.4, 4.5, 4.6) is largely implemented through bilateral projects. W1/2 funding supports some greater policy engagement as well as the work on payments for ecosystem services.

**FP5: Livestock Livelihoods and Agri-Food System**

**B.5 Delivery**

**B.5.1 Expected Annual Milestones towards Outcomes 2022**

As described in the CRP proposal, FP5 had prioritized the use of W1/2 resources for synthesis analyses to generate strategic lessons from the multiple outputs of the bilaterally funded projects that make up the bulk of the flagship’s resources. In the absence of W1/2 resources for 2017, FP5 will achieve only a limited number of milestones. As priority policy-related evidence to influence decision makers and improve investment and regulations in the livestock sector (Outcome 5.1), a strategic analysis will be made available of animal source food (ASF) supply and demand to 2030 and 2050, and understanding of the resulting food security implications. Better awareness among regional policy makers of the trends affecting ASF availability in their countries will contribute to policy decisions that enhance access to ASF (sub-IDOs CC 3.1.3, 2.1.2). CRP management will develop a revamped gender strategy as well as a youth strategy that will inform a new series of research by FP5 on gender and livestock and initiate work by FP5 on youth and livestock, which will contribute to more targeted and demand driven research that will ultimately influence decision makers and the wider research and development community (Outcome 5.3), progressing towards sub IDOs CC 2.1.1 and CC 2.1.3. To inform livestock dependent communities as well as influence public and private development agencies (Outcome 5.5), evidence on the role of livestock in enhancing resilience capacity and production system competiveness in dryland and mixed systems will be disseminated. These learnings will establish the beginnings of a platform to guide interventions to improve the performance of livestock systems both technically and socio-economically, both in mixed and range-based systems, and create viable livelihood opportunities (sub-IDO 1.3.2).

**B.5.2 Output towards Outcomes 2022**

Four key outputs will enable better evidence-based investment and policy formulation for livestock development (Outcome 5.1). A strategic analysis of ASF supply and demand to 2030 and 2050 in selected countries, done jointly with PIM, will highlight food security implications to sensitize decision makers about the strategic importance of livestock. Livestock Master Plans produced in partnership with national partners in Tanzania and Rwanda will raise awareness of what can be achieved through investment while strengthening capacity to internalize this type of analysis. With ReSAKSS, a report will be produced on the importance of livestock in three East Africa countries, and an analysis of policies and regulations affecting the small ruminant value chain in Ethiopia in partnership with Tufts University and the Ministry of Agriculture will target decision makers.

A key output under the gender agenda is the refinement of the Women’s Empowerment in Livestock Index, working with IFPRI, KIT and Emory University. This output will raise awareness among local or national research and development partners about gender and youth-supportive approaches, as well as strengthening their capacity (Outcomes 5.2 and 5.3).

Key outputs in the relatively new area of human nutrition will include a revised strategy document, in partnership with A4NH, providing the priorities of Livestock CRP and opportunities for mainstreaming nutrition (Outcome 5.4). Other key outputs include tools, analyses (including on the link between nutrition, women empowerment and dairy hubs), and the development of a social and behavioral communication strategy, working in East Africa with Sokoine University of Agriculture (Tanzania), London School of Hygiene and Tropical Medicine (LSHTM) and Emory University. These outputs will inform partners on approaches to enhancing livestock-mediated nutritional impact. Capacity development will be addressed through better understanding among project partners and beneficiaries as to the role of ASF in nutrition.

Key outputs from livestock system optimization will include work in both pastoral and mixed systems, looking at opportunities to enhance resilience of livestock production systems, the role of livestock in North Africa, and identifying climate change adaptation strategies of pastoralists in Somalia. A second set of outputs looks at competiveness and economic performance of pig production systems in NW Vietnam and in Uganda. The third set focuses on integrated technology packages in small ruminant value chain in Ethiopia and Pakistan. The last set is a publication characterizing forage adoption in East Africa. By taking into account the multiple functions of livestock, the analyses contribute to the evidence on most adapted technologies and management strategies (Outcome 5.5). In all of these cases, capacity development will be addressed through joint design, implementation and analysis with national partners.

Key outputs from market and institutional innovation research include assessments in Somalia of live-animal value chains, Tunisia on milk cooling technology, and dairy producer organization sustainability in East Africa, including with respect to gender and youth inclusiveness. Evidence on institutional arrangements for enhanced performance of livestock value chains will be compiled, building on the work conducted during Phase 1, including on smallholder dairy value chain delivery in Tanzania. These outputs are therefore providing evidence to development partners and private sector on innovative institutional arrangements for enhanced competitiveness and inclusiveness in livestock value chains. (Outcome 5.6). These outputs will be delivered working with national and international research organisations and development agencies across the CRP countries.

**B.5.3 Contribution of W1-2 Funds**

We will not use W1-2 funds. All research activity will be supported by bilateral/W3 funding, with FP management and certain key capacity supported temporarily from ILRI Reserves.

**Flagship level tables consolidated**

**Table 2**

|  |  |  |  |
| --- | --- | --- | --- |
| **FP No.** | **Mapped and contributing to Sub-IDO** | **Relevant CRP sub-IDO indicators\*** | **2017 Target\*\*** |
| FP1 - LG | 1.3.2 Increased livelihood opportunities | Adoption of improved livestock, that are both productive and adapted, by women and men resource poor livestock keepers in CRP priority countries and other locations (CBBP = Community-based breeding program) | Ethiopia - 5 sheep & 2 goat CBBP (1890 HH,10400 direct beneficiaries); Tanzania - 2 goat CBBP (no HH target 2017) |
| 1.4.2 Closed yield gaps through improved agronomic and animal husbandry practices | Number of national research and development partners and the private sector using CRP developed business models for multiplication and delivery of improved livestock genetics to resource poor women and men livestock keepers in CRP priority countries and other locations   Adoption of improved livestock, that are both productive and adapted, by women and men resource poor livestock keepers in CRP priority countries and other locations | Small ruminant in Ethiopia - 14 national partners using dissemination models  Nigeria, Ethiopia, Tanzania - pilot chicken testing (7,500 HH total); Ethiopia - pilot small ruminant (600 HH); Ethiopia, Tanzania - pilot phenotypic recording dairy cattle |
| 1.4.3 Enhanced genetic gain | Number of policy makers, national research and development partners and the private sector using CRP knowledge (data) to develop or refine genetic improvement strategies in CRP priority countries and other locations Number of policy makers, national research and development partners and the private sector adopting CRP development guidelines on policy and institutional arrangements for improvement of AnGR in CRP priority countries and other locations | No target |
| 1.4.4 Increased conservation and use of genetic resources | Number of policy makers, national research and development partners and the private sector using CRP knowledge (data) to develop or refine genetic conservation and use strategies in CRP priority countries and other locations Number of policy makers, national research and development partners and the private sector adoption CRP development guidelines on policy and institutional arrangements for conservation of AnGR | No target |
| CC 2.1.2 Technologies that reduce women's labour and energy expenditure developed and disseminated | Number of donors, national and international research partners using CRP generated evidence to prioritize gender sensitive research and development interventions that: increase livestock production and/or productivity and/or reduce livestock disease risks for resource poor livestock keepers, especially women, in CRP priority countries and other locations  Number of farmers (m/w) using gender sensitive CRP outputs (e.g. improved genetics, herd health packages, feeds & forages)  Number of farmers (m/w) with better access to animal services & products | Local and national partners in 2 sites of Ethiopia (poultry production) |
| FP2 - LH | 1.4.2 Closed yield gaps through improved agronomic and animal husbandry practices | Number of extension and animal health workers and resource poor livestock keepers adopting CRP developed herd health management packages Number of national and international research partners, government agencies and the private sector using CRP developed diagnostic tools and vaccines for disease control in CRP priority countries and other locations Improved access to livestock-related health services and products for resource poor livestock keepers in CRP priority countries and other locations | 2000 farmers pilot  no target  2000 farmers pilot |
| 2.2.1 Reduced biological and chemical hazards in the food system | Number of resource poor livestock keepers in CRP priority countries and other locations with knowledge of AMR and APR and change their practices accordingly | No target |
| 2.3.2 Reduced livestock and fish disease risks associated with intensification and climate change | Number of donors, national and international research partners using CRP development tools to prioritize research and development interventions that reduce livestock disease risks for resource poor livestock keepers in CRP priority countries and other locations | No target |
| CC 2.1.2 Technologies that reduce women's labour and energy expenditure developed and disseminated | Number of donors, national and international research partners using CRP generated evidence to prioritize gender sensitive research and development interventions that: increase livestock production and/or productivity and/or reduce livestock disease risks for resource poor livestock keepers, especially women, in CRP priority countries and other locations  Number of farmers (m/w) using gender sensitive CRP outputs (e.g. improved genetics, herd health packages, feeds & forages)  Number of farmers (m/w) with better access to animal services & products | 1000 women  2 countries (pilot) |
| FP3 - F&F | 1.3.4 More efficient use of inputs | Number of small- or medium-sized enterprises co-created with development and private-sector partners in decentralized feed processing, forage marketing or seed multiplication in CRP priority countries and other locations Number of development partners, the private sector (feed & forage traders, feed processors) and farmers: a) able to diagnose feed constraints and opportunities and to effectively prioritise and target feed and forage interventions and b) increasing delivery and uptake of feed and forage technologies through proof-of-concept scaling, business model development, extension approaches and value-chain approaches in CRP priority countries and other locations. | No target |
| 1.4.2 Closed yield gaps through improved agronomic and animal husbandry practices | Number of local, national & international research & development partners, the private sector, decision-makers and/or livestock producers using CRP developed forage & rangeland resources (with enhanced traits) to increase the rate of genetic gain and exploit the genetic diversity of forages & rangeland species to enhance stress-tolerance, biomass productivity & nutritive value. Number of new forage, rangeland and crop cultivars, superior to local (based on food, feed & forage traits weighted according to target domains), made available by the private sector (release agencies) and/or applied in CRP priority countries and other locations Number of national & international development partners, government agencies & extension services, the private sector and community-based organisationsbetter utilising existing and novel feed and forage resources | No target  hybrids scaled 15 countries (100,000ha)  No target |
| CC 2.1.2 Technologies that reduce women's labour and energy expenditure developed and disseminated | Number of donors, national and international research partners using CRP generated evidence to prioritize gender sensitive research and development interventions that: increase livestock production and/or productivity and/or reduce livestock disease risks for resource poor livestock keepers, especially women, in CRP priority countries and other locations  Number of farmers (m/w) using gender sensitive CRP outputs (e.g. improved genetics, herd health packages, feeds & forages)  Number of farmers (m/w) with better access to animal services & products | No target |
| FP4 - ENV | 3.1.1 Land, water and forest degradation (including deforestation) minimized and reversed | Number of national government agencies designing and implementing key policies to improve the environmental management of livestock systems in CRP priority countries and other locations | No target |
| 3.2.1 More productive and equitable management of natural resources | Number of national & international development partners, government agencies and extension systems, including livestock production technology developers in CRP priority countries and other locations considering environmental concerns in decision-making Number of government agencies and development partners at local and national levels in CRP priority countries and other locations promoting CRP promoted environmental management options | Novel rangeland restoration techniques piloted in 2 countries  No target |
| 3.2.2 Agricultural systems diversified and intensified in ways that protect soils and water | Number of research and development partners using CRP developed targeted solutions to sustainably increase productivity of cattle, small ruminants and pigs in the face of on-going environmental changes in CRP priority countries and other locations. | No target |
| 3.3.1 Increased resilience of agro-ecosystems and communities, especially those including smallholders | Number of communities piloting payments for ecosystem services in CRP priority countries and other locations Number of national government agencies designing and implementing key policies to improve the environmental management of livestock systems in CRP priority countries and other locations | No target |
| 3.3.3 Reduced net greenhouse gas emissions from agriculture, forests and other forms of land use | Number of research and development partners using CRP developed targeted solutions to sustainably increase productivity of cattle, small ruminants and pigs in the face of on-going environmental changes in CRP priority countries and other locations.  (For all sub-IDO) Number of publications aimed at targeted global agendas developed and disseminated appropriately (For all sub-IDO) Evidence generated by CRP Livestock influences key global livestock agendas (IPCC, Global agenda for Sustainable Livestock) | No target  2 publications aimed at global agendas. |
| CC 1.1.1 Reduced net greenhouse gas emissions from agriculture, forests and other forms of land use | Number of research and development partners using CRP developed targeted solutions to sustainably increase productivity of cattle, small ruminants and pigs in the face of on-going environmental changes in CRP priority countries and other locations.  (For all sub-IDO) Number of publications aimed at targeted global agendas developed and disseminated appropriately (For all sub-IDO) Evidence generated by CRP Livestock influences key global livestock agendas (IPCC, Global agenda for Sustainable Livestock) | No target  2 publications aimed at global agendas. |
| CC 2.1.2 Technologies that reduce women's labour and energy expenditure developed and disseminated | Number of donors, national and international research partners using CRP generated evidence to prioritize gender sensitive research and development interventions that: increase livestock production and/or productivity and/or reduce livestock disease risks for resource poor livestock keepers, especially women, in CRP priority countries and other locations  Number of farmers (m/w) using gender sensitive CRP outputs (e.g. improved genetics, herd health packages, feeds & forages)  Number of farmers (m/w) with better access to animal services & products | No target |
| CC 2.1.3 Improved capacity of women and young people to participate in decision-making | Number of communities and households (women & youth focus) adopting CRP developed gender responsive environmental management options that are well adapted to Global Environmental Change (GEC) in CRP priority countries and other locations | No target |
| FP5 - LLAFS | 1.1.1 Increased household capacity to cope with shocks | Number of livestock communities applying tested technologies, management strategies and institutional arrangements that have been developed through system optimization, taking the multiple functions of livestock into account in CRP priority countries and other locations | 8 communities implementing CBBPs |
| 1.2.2 Reduced market barriers | Number of development partners, private sector and government agencies applying innovative institutional arrangements to enhance competitiveness and inclusiveness in CRP priority countries and other locations | No target |
| 1.3.2 Increased livelihood opportunities | Number of development partners, private sector and government agencies applying innovative institutional arrangements to enhance competitiveness and inclusiveness. Number of livestock communities applying tested technologies, management strategies and institutional arrangements that have been developed through system optimization, taking the multiple functions of livestock into account in CRP priority countries and other locations | No target  8 communities implementing CBBPs |
| 2.1.2 Increased access to diverse nutrient-rich foods | Number of national and international development partners, government agencies and private sector investing in and using the most successful approaches to enhancing livestock-mediated nutritional impact, including institutional arrangements and behavioural approaches in CRP priority countries and other locations Number of national and international research partners and policy makers use analyses of livestock-sector dynamics, investment and ex-ante impact assessments to guide priority setting, investment and policy development for the livestock sector in CRP priority and other countries - should be across many sub-IDO! | No target |
| CC 2.1.1 Gender-equitable control of productive assets and resources | Number of policy or decision-makers using CRP generated evidence on the benefits of including gender equity considerations in CRP priority countries and other locations Number of local or national development partners adopting gender transformative and youth supportive approaches using CRP generated evidence in CRP priority countries and other locations | No target |
| CC 2.1.3 Improved capacity of women and young people to participate in decision-making | Number of policy or decision-makers using CRP generated evidence on the benefits of including gender equity considerations in CRP priority countries and other locations Number of local or national development partners adopting gender transformative and youth supportive approaches using CRP generated evidence in CRP priority countries and other locations | No target |
| CC 3.1.3 Conducive agricultural policy environment | Number of policy and decision-makers in CRP priority countries and other locations use CRP-developed evidence when developing policy options relative to improving the performance of livestock value chains  Number of national and international research partners and policy makers use analyses of livestock-sector dynamics, investment and ex-ante impact assessments to guide priority setting, investment and policy development for the livestock sector in CRP priority and other countries | No target |
| All FP - CC 4 | CC 4.1.1 Enhanced institutional capacity of partner research organisations | Number of partner organisations who use CGIAR (gender sensitive) learning materials and approaches Partner institutions perceptions of the benefits and challenges of using CapDev enabled approaches generated by CRPs Percentage of stakeholders expressing a positive attitude towards CapDev efforts in the CRP | partners in 2 countries  No target  No target |
| CC 4.1.2 Enhanced individual capacity in partner research organisations through training and exchange | Number of fellows/trainees (disaggregated by gender, length of training, etc.) Number of long-term fellows working in national/regional agricultural systems (24 months after completing fellowship) Number of peer reviewed publications led by National Agricultural Research System (NARS) partners with CGIAR co-authors Fellows and trainees applying research-for-development skills, tools and methods in their work Number of capacity development materials produced | Approx. 50  No target  1 - 2 per country  No target  approx. 20 (1/CoA) |
| CC 4.1.3 Increased capacity for innovation in partner research organisations | Composite index measuring capacity to innovate (to be defined with the capacity to innovate and the resilience and adaptive capacity group) Partner institutions perceptions of the benefits and challenges of using CapDev enabled approaches generated by CRPs | No target |
| CC 4.1.4 Increased capacity for innovation in partner development organisations and in poor and vulnerable communities | Number of multi-stakeholder platforms CRP Livestock engages with Percentage of stakeholders expressing a positive attitude towards CapDev efforts in the CRP Percentage of stakeholders expressing a positive change in collaborative capacity Partner institutions perceptions of the benefits and challenges of using CapDev enabled approaches generated by CRPs | 1 - 2 in CRP priority countries No target  No target  No target |

**Table 3: Expected Annual Milestones (progress markers) towards Outcomes 2022**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **FP No.** | **FP Outcome 2022** | | **Milestone 2017** | | | **Mapped Budget request for 2017** | | | |
| **W1/W2 USD** | **W3/Bilateral USD** | | |
| FP1 - LG | **Outcome 1.1** Data on livestock diversity and systems, including from a gendered lens, used to develop or refine genetic improvement and / or conservation strategies by policymakers, national research and development partners, and the private sector, in 5 CRP priority countries and other locations. | | **Milestone 1.1.1** Increased data availability on livestock diversity and systems, including from a gendered lens. | | | 1,556,117 | 2,395,513 | | |
| **Outcome 1.2** Genetic improvement strategies for improved livestock genetics implemented by national research and development partners, and the private sector in 6 CRP priority countries and other locations. | | **Milestone 1.2.1** Increased understanding of phenotypic and genotypic performance of livestock populations to provide inputs to the design of genetic improvement strategies. | | | 565,110 | 759,892 | | |
| **Milestone 1.2.2** Breeding schemes developed and piloted in CRP priority countries | | | 753,480 | 1,139,839 | | |
| **Milestone 1.2.3** Protocols in place for the collection of data for phenotypic and production systems characterisation, for genome editing and ex-situ conservation. | | | 565,110 | 1,899,731 | | |
| **Outcome 1.3** Business models for multiplication and delivery of improved livestock genetics, to resource poor women and men livestock keepers, implemented by national research and development partners, and the private sector in five CRP priority countries and other locations. | | **Milestone 1.3.1** Constraints and opportunities for institutional arrangements identified for CRP countries and focus species. | | | 249,672 | 1,651,507 | | |
| **Outcome 1.4** Women and men resource poor livestock keepers sustainably utilising improved livestock genetics, both productive and adapted, in 3 priority countries and other locations. | | **No milestone** | | | 0 | 0 | | |
| **Outcome 1.5** Guidelines on policy and institutional arrangements for improvement and conservation of animal genetic resources (AnGR) adopted by policymakers, national research and development partners, and the private sector, in 7 priority countries and other locations | | **Milestone 1.5.1** Draft guidelines on policy and institutional arrangements available for decision-makers to review, in specific CRP countries (e.g. certification of improved small ruminants in Ethiopia, pig breeding in India) | | | 59,943 | 184,143 | | |
| FP2 - LH | | **Outcome 2.1** Assessment tools for significance of animal diseases and risk maps for emergence of animal diseases are used by 100 local and national and 50 international research partners and donors to prioritise research and development interventions to reduce livestock disease risks for livestock keepers. | | **Milestone 2.1.1** Gender-sensitive disease assessment tools harmonised across priority CRP countries and frameworks to quantify disease impacts and risk models developed. | 391,559 | | | 0 |
| **Outcome 2.2** Context specific herd health management packages adopted by farmers, extension and animal health workers in priority countries and other locations. | | **Milestone 2.2.1** Robust and feasible framework developed to determine appropriate herd health packages, and package components, in priority CRP countries, regarding production and social (gender, youth and livelihood) dimensions. | 619,291 | | | 74,440 |
| **Outcome 2.3** Livestock keepers have necessary knowledge of AMR and antiparasitic resistance (APR) to change their practices accordingly, piloted in two priority countries. | | **Milestone 2.3.1** Gender and youth sensitive protocols to assess availability and KAP for antimicrobials and anti-parastics developed and tested. | 265,410 | | | 49,627 |
| **Outcome 2.4** National and international research partners, government agencies and the private sector use 2 novel diagnostic assays and vaccines for control of ASF, CBPP, CCPP, ECF and PPR in at least 6 priority countries. | | **Milestone 2.4.1** Vaccine production (PPR) and release (ECF - ITM) by partners in priority CRP countries | 239,237 | | | 1,360,746 |
| **Milestone 2.4.2** Proof of concept vaccine development (ECF, CCPP, CBPP, ASF) ; Evaluation of current vaccines (CBPP, PPR) ; Diagnostics development (CBPP, mycoplasma) | 2,153,137 | | | 3,175,074 |
| **Outcome 2.5** Improved access to livestock-related health services and products for female and male livestock keepers in 4 priority countries | | **Milestone 2.5.1** Gendered animal health service and product access current status in CRP priority countries well understood and documented. | 241,881 | | | 0 |
| **Milestone 2.5.2** With partners, pilot-tested and/or scaled-up previously identified services and products in CRP and other countries. | 26,876 | | | 0 |
| FP3 - F&F | | **Outcome 3.1** Local, national and international research and development partners, the private sector, decision-makers and livestock producers are able to diagnose feed constraints and opportunities and to effectively prioritize and target feed and forage interventions, resulting in: a 10% improvement in utilization of feeds and forages, a 20% increase in animal production using improved feed and forage technologies, a 10% accuracy increase for biomass and quality estimation and at least 250,000 annual visitors to global databases, repositories, interactive tools and maps and the Tropical Grasslands—Forrajes Tropicales journal website. | | **Milestone 3.1.1** Research and development partners, decision makers and input suppliers use at least 2 tools designed or promoted by the CRP (e.g. CHOICE) for regional and national feed supply and demand scenarios in 2 priority countries (Vietnam, Ethiopia). Awareness of research partners increased through promotion of CRP generated knowledge through Tropical Grassland journal. | 0 | | | 71,254 |
| **Outcome 3.2** Capacity development of research and development partners and service providers (private sector) are using up-to-date technology which is cost effective (accuracy and rapidity) | | **Milestone 3.2.1**  Knowledge updating: New equations for stationary and mobile NIRS integrated into platform for Colombia and Ethiopia. | 0 | | | 17,813 |
| **Outcome 3.3** National and international research and development partners and the private sector are using CRP developed forage and rangeland resources (with enhanced traits), in 30 countries and reaching producers who plant over 2 million ha, to increase the rate of genetic gain and exploit the genetic diversity of forages and rangeland species to enhance stress-tolerance, biomass productivity and nutritive value. | | **Milestone 3.3.1** New cohort of promising Urochloa hybrids defined for later use in breeding activities. New crosses of breeding lines available for further research and already available forage hybrids scaled with private sector partner in at least 15 countries on 100,000 hectares | 0 | | | 291,293 |
| **Milestone 3.3.2** Genotyped CRP collections (e.g. P.purpureum) to identify potential for enhancement and plans for improved phenotyping and genotyping efficiency developed. | 0 | | | 291,293 |
| **Milestone 3.3.3** Representative collections (3 - 5 species for diverse agro-ecosystems) of Cactae, Brachiaria and Panicum identified, characterized or promoted for release in North & East Africa and Colombia | 0 | | | 291,293 |
| **Outcome 3.4** New forage and crop cultivars, superior to local (based on food, feed and fodder traits weighted according to target domains), made available by development partners, government agencies and the private sector and applied by farmers in 7 priority counties and other locations. | | **Milestone 3.4.1** Cultivars with potential for genetic enhancement identified (maize, rice, wheat, cowpea and barley) | 0 | | | 291,293 |
| **Outcome 3.5** Better utilization of existing and novel feed and forage resources through: scalable and gender-responsive processing technologies, management strategies to conserve and rehabilitate rangelands while producing, preserving and storing feed biomass and diet formulation that increases productivity while reducing overall feed and forage costs and environment impacts, by national and international development partners, government agencies and extension services, the private sector and community-based organisations in 3 priority countries. | | **Milestone 3.5.1** Tools developed for increasing productivity while reducing feed and labour costs (India), considering gender-responsiveness and scalability | 0 | | | 209,249 |
| **Milestone 3.5.2** Assessment of current commercial and on-farm silage production (India). | 0 | | | 209,249 |
| **Outcome 3.6** Co-creation with development and private-sector partners of up to 5000 small- or medium-sized enterprises in decentralized feed processing, forage marketing or seed multiplication, in 4 priority countries (2022). | | **Milestone 3.6.1** Knowledge required for designing business models (e.g., cost-benefit analyses, business plans, evaluation adoption factors influencing uptake, sector review) developed for 3 countries (Tunisia, Kenya, Colombia). | 0 | | | 254,917 |
| **Outcome 3.7** National and international development partners and other value-chain actors adopt and scale up at least 2 of the tested extension approaches (including at least 1 that improves women’s access to information) in 5 priority countries (2022). | | **Milestone 3.7.1** Gaps around promising feed, forage and processing technologies identified in 2 countries (Tunisia, Colombia) that serve as a basis for the development of new extension approaches | 0 | | | 382,375 |
| **Outcome 3.8** Increased delivery and uptake of feed and forage resources through proof-of-concept scaling, business model development and value-chain approaches by development partners, the private sector (feed and forage traders, feed processors) and (1 million by 2022) farmers across diverse environments in priority countries and other locations in Latin America, North and East Africa and South and Southeast Asia. | | **Milestone 3.8.1** Exchange with Innovation Platforms, Roundtables and private sector around feed, forage and processing technologies established in at least 3 countries (Tunisia, Kenya, Colombia) as a first step to improve technology uptake | 0 | | | 637,292 |
| FP4 - Env | | **Outcome 4.1** Environmental concerns are considered in decision making across at least 10 priority countries and other locations, by national and international development partners, government agencies and extension systems, including technology developers seeking to improve cattle, small ruminant and pig production. | | **Milestone 4.1.1** Framework for assessing environmental footprints of technologies and interventions developed and tested (in at least 2 CRP countries) and results and associated assessment tools disseminated. | 535,121 | | | 1,523,381 |
| **Outcome 4.2** Targeted solutions are used by research and development partners, across at least 10 priority countries and other locations, to increase the productivity of cattle, small ruminants and pigs in the face of ongoing environmental changes. | | **No milestone** | 356,747 | | | 1,015,587 |
|
| **Outcome 4.3** Government agencies and development partners at local and national levels across at least 10 priority countries and other locations are promoting environmental management options. | | **Milestone 4.3.1** GHG emissions from three common livestock production systems using standard technologies assessed in Kenya, Tanzania and Vietnam. | 822,305 | | | 1,411,004 |
| **Outcome 4.4** National government agencies across at least 5 priority countries design and implement key policies to improve the environmental management of livestock systems. | | **Milestone 4.4.1** Synthesis of policy issues on reducing GHG emissions from livestock published. | 306,980 | | | 1,336,906 |
|
|
| **Outcome 4.5** Communities pilot payments for ecosystem services in 3 priority countries. | | **No milestone** | 102,327 | | | 445,635 |
| **Outcome 4.6** Evidence generated by the flagship influences key global livestock agendas (IPCC, Global agenda for Sustainable Livestock). | | **No milestone** | 102,327 | | | 445,635 |
| FP5 - LLAFS | | **Outcome 5.1** National and international research partners and policymakers use analyses of livestock-sector dynamics, investment and ex-ante impact assessments to guide priority setting, investment and policy development for the livestock sector in six priority CRP countries | | **Milestone 5.1.2** Priority and policy-related evidence to influence decision-makers with respect to investment and regulations in the livestock sector generated. | 0 | | | 487,494 |
| **Outcome 5.7** Policy and decision-makers in 4 priority countries use CRP-developed evidence when developing policy options relative to improving the performance of livestock value chains | | **No milestone** | 0 | | | 121,873 |
| **Outcome 5.2** Policy- or decision-makers in 4 priority countries use the evidence on the benefits of including gender equity considerations | | **No milestone** | 0 | | | 128,203 |
| **Outcome 5.3** Local or national development partners in four priority countries adopt gender-transformative and youth-supportive approaches (using the evidence from the CRP). | | **No milestone** | 0 | | | 299,139 |
| **Outcome 5.4** National and international development partners, government agencies and the private sector invest in and use the most successful approaches to enhancing livestock-mediated nutritional impact, including institutional arrangements and behavioural approaches, in 4 priority countries. | | **No milestone** | 0 | | | 252,479 |
| **Outcome 5.5** Livestock communities across 4 priority countries apply tested technologies, management strategies and institutional arrangements that have been developed through system optimization, taking the multiple functions of livestock into account. | | **Milestone 5.5.1** Generate evidence on the role of livestock in enhancing resilience capacity and production system competiveness in dryland and mixed systems. | 0 | | | 5,113,335 |
|
| **Outcome 5.6** Development partners, private sector and government agencies across 6 priority countries apply innovative institutional arrangements to enhance competitiveness and inclusiveness. | | No milestone | 0 | | | 6,556,030 |

**Table 4: Expected Key Output 2017 towards Outcomes 2022**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  | Tagging of expected outputs 2017 | | |
| **FP No.** | **FP Outcome 2022** | **CoA / Key Output 2017** | **G** | **Y** | **CD** |
| FP1 - LG | Outcome 1.1 | New datasets and knowledge on phenotypes, genotypes and agro-systems characteristics (chicken, small ruminants, cattle), including steps towards integration of this information in a single database (DAGRIS) | 0 | 0 | 0 |
| Outcome 1.2 | Improved breeding schemes (CBBP and chicken) | 1 | 1 | 1 |
| Identified adaptive signature of selection at genome level to environmental challenges (e.g. climate (heat) and infectious diseases selection pressures (e.g. cattle)) | 0 | 0 | 1 |
| New technologies (phenotypic platform, optimised open-data kit (ODK) systems, genome editing protocols) | 0 | 0 | 1 |
| Outcome 1.3 | Assessment of institutional arrangements for delivery of improved genetics and guidelines on delivery options (dairy cattle) | 1 | 1 | 1 |
| Outcome 1.4 | No Key Outputs 2017 (All other FP1 Key Outputs contribute to this 2022 Outcome). | - | - | - |
| Outcome 1.5 | Review of published baseline information on best practices and lessons on AnGR improvement in Africa | 1 | 1 | 0 |
| FP2 - LH | Outcome 2.1 | Gender-sensitive assessment tools for identifying site-specific disease priorities | 1 | 0 | 1 |
| Modelling framework for quantifying disease impact and risk maps (prioritising: ECF, ASF and PPR) | 1 | 0 | 1 |
| Outcome 2.2 | Identified key herd health issues in priority CRP countries | 1 | 1 | 0 |
| Framework for identifying appropriate herd health package components. | 1 | 1 | 1 |
| Outcome 2.3 | Protocols for determining availability and KAP of antimicrobial (AM) and antiparasitic (AP) use | 1 | 0 | 0 |
| Tested protocols and use-case data for 2 CRP priority countries | 1 | 0 | 0 |
| Outcome 2.4 | New lateral-flow diagnostic for CBPP and feasibility assessment for small ruminant mycoplasma diagnostic improvement | 0 | 0 | 0 |
| Data on vaccine improvement work (ECF, CBPP, CCPP, ASF) | 0 | 0 | 0 |
| Production and assessment of PPR vaccine | 0 | 0 | 1 |
| Outcome 2.5 | Gendered animal health service and product delivery current status assessment in CRP priority countries | 1 | 1 | 1 |
| Improved access to specific services & products (vaccines in Mali, PPR vaccine testing Mali / Botswana, ECF ITM delivery Tanzania / Kenya, validation of CBPP & CCPP ELISA) | 1 | 1 | 1 |
| FP3 - F&F | Outcome 3.1 | Regional case studies on feed surplus/deficit areas | 1 | 1 | 1 |
| International publications on tropical forage issues | 0 | 0 | 1 |
| Additions to legume CHOICE tool | 0 | 0 | 1 |
| Outcome 3.2 | New equations for stationary and mobile NIRS | 0 | 0 | 2 |
| Use of NIRS for diversity of feed stuff (Ethiopia) and forage breeding (Columbia) | 0 | 0 | 2 |
| Outcome 3.3 | Genomic selection and phenotyping efficiency review | 0 | 0 | 1 |
| Forage and rangeland collections, characterisation and performance assessment (Urochloa hybrids, P.purpureum, Megathyrsus maximus, other species) | 0 | 0 | 0 |
| Outcome 3.4 | Cultivar assessment and genetic selection / enhancement options (maize, rice, wheat, cowpea, barley); Phenotypic assessments (sorghum, pearl millet) | 0 | 0 | 0 |
| Outcome 3.5 | Draft tool for increasing productivity while reducing feed and labour costs | 1 | 1 | 1 |
| Comparison of commercial vs. farmer produced silage. | 1 | 0 | 1 |
| Outcome 3.6 | Business plans for feed block manufacturing enterprises (Tunisia) | 1 | 1 | 1 |
| Cost-benefit analyses (forage technologies - Kenya, Colombia) | 0 | 0 | 0 |
| Framework for evaluating adoption factors influencing update of improved forage technologies (Colombia) | 1 | 1 | 0 |
| Assessment of feed effects on milk quality & quantity (Kenya) | 1 | 0 | 0 |
| Forage seed sector review (Tunisia) | 0 | 0 | 0 |
| Outcome 3.7 | Current situation survey (Tunisia) | 1 | 0 | 0 |
| Forage technology identification & knowledge gaps (Colombia) | 1 | 0 | 1 |
| Outcome 3.8 | Gendered Innovation platforms (IP) with meetings around feed resources in ruminants value-chain (Tunisia) | 1 | 0 | 1 |
| Farmers linked to forage seed sources (Kenya) | 1 | 0 | 1 |
| Tested forage performance (E & S Africa) | 0 | 0 | 0 |
| Promoted CIAT forage concepts (Colombia). | 0 | 0 | 1 |
| FP4 - Env | Outcome 4.1 | Paper on gendered and other social differences in livestock management and sensitivities to environmental change | 2 | 1 | 0 |
| Framework for assessing multiple environmental footprints for specific packages of production technologies and interventions | 1 | 1 | 1 |
| Outcome 4.2 | Assessments of the environmental impacts of packages of technology interventions, including forages and breeding (using framework above). | 0 | 0 | 1 |
| Outcome 4.3 | Reports and publication on rangeland restoration in three CRP countries | 0 | 0 | 1 |
| Reports on GHG emissions from feeding cattle local diets, manure management and biodigesters. | 0 | 0 | 1 |
| Report evaluating the roles of women and youth in the environmental management (and impact) of livestock production | 2 | 2 | 0 |
| Outcome 4.4 | Assessment of current initiatives to improve land and resource tenure arrangements | 1 | 0 | 1 |
| Collaboration with government partners on key policy mechanisms. | 0 | 0 | 1 |
| National policy advice on GHG mitigation and building resilience to drought. | 0 | 0 | 2 |
| Outcome 4.5 | Evaluation of current opportunities and constraints to payments for ecosystem services, including policy and institutional issues. | 1 | 0 | 0 |
| Outcome 4.6 | Issue papers on GHG mitigation and drought resilience. | 0 | 0 | 1 |
| FP5 - LLAFS | Outcome 5.1 | Strategic analysis of ASF supply and demand to 2030 and 2050 in a set of target CRP countries in SSA and Asia (joint CRP effort conducted with PIM/IFPRI) | 0 | 0 | 0 |
| Outcome 5.7 | Livestock Master Plans (LMP) produced in partnership with national government agencies in Tanzania (MoA) and Rwanda (MARD and FAO), as well as several policies briefs and high level events. | 0 | 0 | 1 |
| A set of targeted policy related outputs addressing specific topics of interest including a report on the importance of livestock in three East African countries (in collaboration with ReSAKSS) | 0 | 0 | 1 |
| Analysis of policies and regulations affecting small ruminants VCs in Ethiopia (in partnership with Tufts University and the MoA) | 0 | 0 | 0 |
| Outcome 5.2 | Employing and refining the Women’s Empowerment in Livestock Index (with IFPRI, KIT and Emory Univ) | 2 | 2 | 1 |
| Outcome 5.3 | Employing and refining the Women’s Empowerment in Livestock Index (with IFPRI, KIT and Emory Univ) | 2 | 2 | 1 |
| Outcome 5.4 | A revised strategy document for priority-setting and opportunities for mainstreaming nutrition (with A4NH) | 1 | 0 | 0 |
| A new tool and associated case study analysis to assess ASF intake and contribution to diet, with data from Tanzania (with LSHTM and Emory Univ.) | 1 | 0 | 0 |
| A social and behavioural communication strategy for dairy consumption in Kenya and Tanzania (with LSHTM and Emory Univ.) | 1 | 0 | 1 |
| Publications - role of ASF in Uganda (with LSHTM), implications for household nutrition and women's empowerment of participation in dairy business hubs in Tanzania (with LSHTM and Emory Univ.) | 1 | 0 | 0 |
| Outcome 5.5 | Publications on: opportunities to enhance resilience of livestock production systems, the role of livestock in North Africa, and identifying climate change adaptation strategies of pastoralists in Somalia (multiple partners) | 0 | 0 | 0 |
| Publications on competiveness and economic performance of pig production systems (multiple partners) | 0 | 0 | 0 |
| Report on integrated technology packages defined and implemented for small ruminant VC sites in Ethiopia with a number of development partners | 1 | 0 | 1 |
| Report on prioritized technologies to enhance small ruminant value chain performance in Pakistan and at least 2 scientific publications on major technical interventions tested with partners | 0 | 0 | 0 |
| Publication characterizing forage adoption in East Africa | 0 | 0 | 0 |
| Outcome 5.6 | Value chain assessment on livestock products focusing on Somalia (with Terra Nuova) | 0 | 0 | 0 |
| Report on a business model and cost benefit analysis for milk cooling technology adapted to Tunisian milk market | 0 | 0 | 0 |
| Paper on factors affecting progress toward dairy producer organization sustainability in East Africa (with Heifer International) | 1 | 1 | 1 |
| Journal article on institutional arrangements tested under Livestock & Fish CRP | 0 | 0 | 0 |
| Report on lessons for sustainable smallholder dairy value chain delivery in Tanzania including the use of Theory of Change | 0 | 0 | 0 |